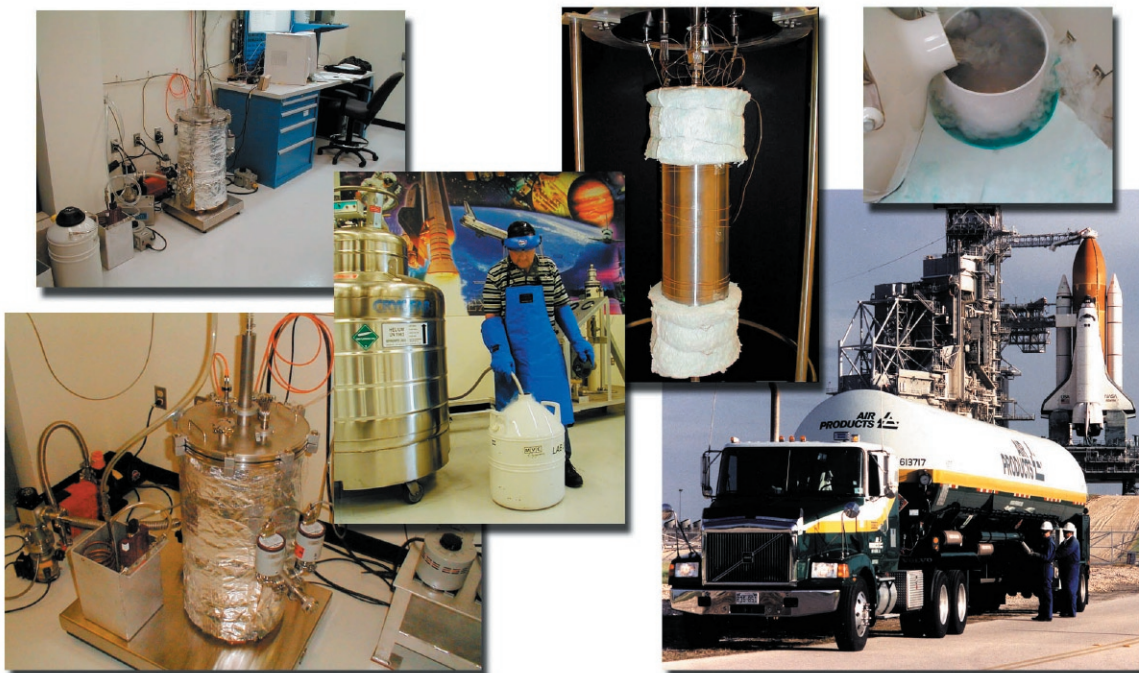


## Technology Opportunity

### Test and Measurement


## Multipurpose Thermal Insulation Test Apparatus (Cryostat 2)

The National Aeronautics and Space Administration (NASA) seeks to license its Multipurpose Thermal Insulation Test Apparatus technology. Designed by the Cryogenics Test Laboratory at the John F. Kennedy Space Center (KSC) in Florida, this technology performs thermal performance test, measurement, and evaluation of insulation, materials, sensors, and related components in actual use environments. Insulation system performance testing to determine apparent thermal conductivity (k-value) can be applied to cylindrical, continuously rolled products, blanket forms, flat-plate configurations, and molded, poured, or loose-fill forms. This technology is additionally useful as a test chamber and method for thermal flow and related heat transfer studies involved in high- and soft-vacuum environments.



### Benefits

- Provides direct, comparative measurements of apparent thermal conductivity (k-value).
- Allows an adaptable operation for one-day test capability (one day per test article).
- Provides quality control diagnostics of thermal insulation system manufacturing processes.
- Reduces heat leakage through the ends of the apparatus to very low and repeatable levels with custom-designed Aerogel thermal guards.
- Reconfigures quickly and easily for assorted test articles.
- Contains a one-step cooling, filling, and thermal stabilization process.
- Minimizes need for operator interface with its automatic operation.
- Provides long-term reliability and consistent repeatability of system calibration.
- Produces long-duration, steady-state measurement of heat flux through insulation test articles.
- Permits flexibility of pressure environments from high vacuum to soft vacuum to atmospheric pressure levels.
- Displays complete temperature profile across thickness of insulation test article for detailed performance information.

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- Maintains stable cold boundary temperature from top to bottom of sleeve (to 77 K, -196 °C).
  - Maintains stable warm boundary temperature on outer surface of insulation (to 373 K, 100 °C).
  - Uses different environments of residual gases.
  - Provides the ability to test continuously rolled insulation materials as well as blanket, loose, and molded product forms.

## Potential Commercial Uses

- Cryogenics equipment manufacturers and suppliers
- Research facilities
- Multilayer insulation (MLI) manufacturers and users
- Cryomedical or cryobiological equipment manufacturers
- Refrigeration manufacturers and transporters

## The Technology

The test apparatus is a fluid boil-off calorimeter system that includes an inner stainless steel cylindrical cold mass assembly within a thermal vacuum chamber. The test article is wrapped around or fastened to the cold mass. A single port through the top of the vacuum chamber facilitates both filling and venting. A fill tube with funnel typically supplies the inner vessel of the cold mass. Custom-designed Aerogel stacks provide thermal guarding at the ends of the cold mass so that virtually all heat transfer takes place through the test article. Temperature sensors and vacuum measurement devices located on the vacuum chamber, cold mass, and insulation and outside the inner cylinder trace all conditions so that accurate k-values are determined.

## Options for Commercialization

NASA seeks qualified companies to commercialize the technology Multipurpose Thermal Insulation Test Apparatus. This and other technologies are made available by the KSC Technology Commercialization Office through a variety of licensing and partnering agreements. These include patent and copyright licenses, cooperative agreements, and reimbursable and nonreimbursable Space Act Agreements.

## Contact

If your company is interested in the technology Multipurpose Thermal Insulation Test Apparatus or if you desire additional information, please reference Case Number KSC-12108 and contact:

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### Commercialization Checklist

- Patent pending
- ✓ U.S. Patent: 6,487,866
- Copyrighted
- ✓ Available for licensing
- Available for no-cost transfer
- Seeking industry partner for further codevelopment

KSC-12108/TOP10-63/01-03/3.4